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THE HOW-&-WHY SERIES NO. 4

THE LIFE OF BIRDS

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THE LIFE OF BIRDS

BY

T. A. COWARD

THE HOW-&-WHY SERIES
EDITED BY
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THE LIFE OF BIRDS

CHAPTER I

THE BIRD

IF you go into public parks in London, or indeed any large town, you will see children, and grown-ups too, feeding the birds. Very likely many of you carry crumbs or biscuits because you know that the birds will expect them. Sparrows fly down from the trees and others come bustling up from a distance when they see the chance of a meal; some of them will flutter into the air and neatly catch the crumbs when you scatter them. Some very adventurous sparrows will perch on the shoulders, even the heads, of people they know well.

The gardener does not love the house sparrow when it pulls to bits a crocus or primrose. The farmer hates sparrows when in autumn they swarm in the cornfields. But in the parks and round the bird-table in the garden we all like to see the sparrows enjoying their meals. They are confiding, friendly, nimble little fellows, cheekily looking at you with head a little on one side. The sparrow trusts you and you like him to trust you. And the sparrow very quickly learns where people feed the birds.

When you are digging in the garden a robin very quickly comes to see what you are doing; he knows what to expect, and, watching with big bright eyes, hops smartly to pick up any worm or insect that your spade has turned up. You leave your spade in the soil for a moment and there he is on the handle, warbling a low, contented little tune. There are places that I know well on the Derbyshire hills and in Yorkshire dales where if you sit down for a moment a chaffinch is sure to come whisking past your head to drop near your feet. It knows that here ramblers often sit to eat their lunch, and that when they see him and hear him say *pink*, *pink*, he is certain to get a share.

Birds are general favourites, and when they are treated kindly and are fed they look upon us as their friends. It is not their bright colours and neat forms only that attract us; their habits, their ways of doing things, are delightful. We hang a suet bag, a split cocoanut, or a bone on a string, and the blue tit, or tom-tit, performs gymnastics on it, hanging upside down and swinging as it pecks off little bits. In the park we can watch the ducks on the pond; they are quite ready to be fed. Mallards, teal, and several other kinds feed near the edge, where the water is shallow. They tip up their tails and stand on their heads in the water, reaching down for food, but pochards and tufted ducks, and others which are called diving-ducks, swim under water after food that has sunk. Fat wood pigeons waddle about on the grass, close to the path, and are not at all afraid, though in the country few birds are more nervous. They know that in the park they are safe. Wherever most birds are kindly treated, and are not stoned or shouted at, they get quite tame.

Because you like birds and enjoy hearing them sing you want to know one kind from another and learn their names. You would like to be able to tell a tree sparrow from a house sparrow, or from the bird that is often called a hedge sparrow but really is not a sparrow at all. You want to know which duck is a teal, which a wigeon, and how a pochard differs from a tufted duck. The colour and pattern of their feathered dress, or plumage, and the shape of their bills and feet will help, but these we might learn from pictures in a book, or from stuffed birds in a museum. But it is much better to know the living bird, so we must learn something of habits and think of the place where we see them.

We shall not find all the birds, even all the common ones, in the park. We must go into the country, into the fields and woods, on to the hills, along the riverbank or shore; in each place we shall find some birds that we are unlikely to see in other kinds of country.

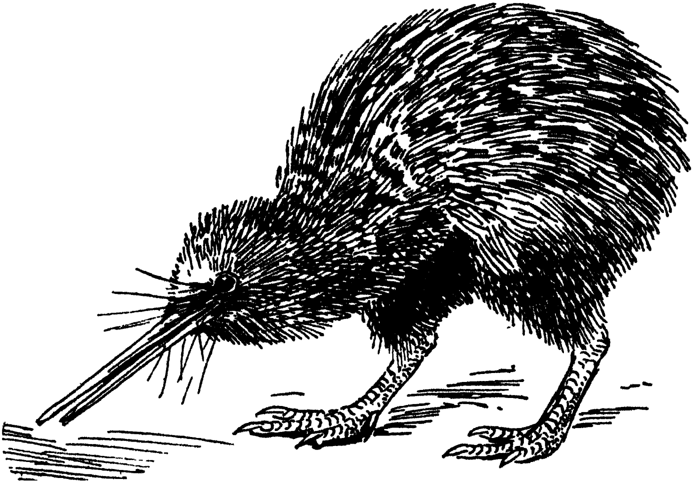
First let us think about the plumages, the garments of birds. Each different kind of bird is distinguished by its plumage. In some the feathers are gay and brightly coloured, in others they are duller, though always neat. When you see the cock pheasant strutting about, his long tail gracefully curved rather than drooped behind him, with the sun glinting on feathers that shine like polished metal, he looks very proud and pleased with himself. His mate is not nearly so showy, later we will tell you why. The little greeny-yellow willow warbler is just as pleased with his more sober dress. Amongst the thick green leaves of summer he is not easy to see, and this is an advantage to him should enemies be about.

Some birds have feathers or feather patches by which we can name them at a glance. Think of the many-hued eyes on the peacock's so-called tail. The plumes that it spreads so proudly are very much enlarged feathers above the true tail and are called tail-coverts. The golden head of the yellowhammer is another good label, and the red and white on its head and gold splash on the wing will tell us that a bird is a goldfinch. But when we look at the delicate greys and whites of gulls and terns, we see that many kinds are so much alike that we must look carefully for distinctions. In many gulls the colour of the legs is a good guide, and the smallest of those we commonly see is the black-headed gull, and it, beside having very red feet and bill, has a brown hood over its head and neck.

The black-headed gull, however, is a good example of a great difficulty in talking about plumages, for it has no brown head in winter. Many birds change their clothes once or twice a year, and look quite different in summer and winter dresses. Again, as I mentioned about the pheasant, male and female birds often differ. This is so with most of the ducks. The drake mallard or wild duck is a very smart bird in winter, from autumn until early spring. His head is glossy bottle-green and a white collar divides this from his warm brown breast; on his wing is a purple patch bordered by white. His mate is clad in brown of varying shade, though she has a similar wing-patch. For a short time he dresses rather like his mate in what is called his 'eclipse' plumage.

This is not all, for most young birds are unlike their parents. Some, like the gannets and gulls, which take several years to grow into mature birds, alter their plumage a little every year. We must remember that not only may the male and female differ, and have distinct dresses for summer and winter, but that their young may have garments that can only be compared with baby-clothes and those into which we change when we get a little older.

Feathers are the bird's clothes, and as a rule the feathers of wings and tail are strong and stiff, and those that cover its body soft and loose. Feathers may be so fluffy that flight is noiseless, as those of owl and nightjar; they may be hair-like, as the long plumes that cover the queer New Zealand kiwi; or they may be more like scales. Those of the water-loving penguins are stiff and scale-like. The body feathers in most birds overlap those immediately below them; fitting closely, they keep the bird warm, for they retain heat. Yet they can be ruffled by the bird and smoothed again when it shakes itself to throw off dust or loose feathers, or to let the air get in beneath.



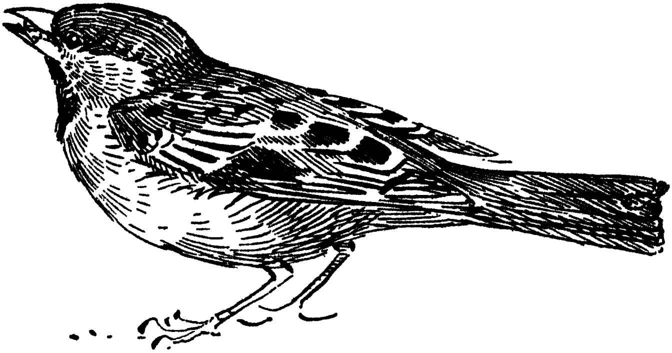
KIWI

We will not go closely into how a feather is made. It has a stiff shaft or main support, from which spring branches, known as barbs, and these again have finer branches called barbules. When a feather is in its proper position these barbs and barbules are hooked together by a series of minute hooks and notches, which are only visible through a microscope. If, however, you stroke a feather gently between your thumb and finger you will see how they come unfastened, and by again stroking it more gently still you can hook them back into place. When the bird attends to its toilet it can hook and rehook them with its bill better and more quickly than you can with your hand.

Clothes wear out; so do feathers. When worn and shabby the old feathers are pushed out by little ones that grow below them, and when this happens we say that the bird is moulting or in Moult. In all birds the autumn moult, when the worn-out summer dress is shed, is the more important, for then the warmer, better dress for winter is obtained. Many birds have a spring moult, but it is seldom as complete as that in autumn. But you will say that many birds are in their brightest and most showy plumage in spring, when they want to look their best during courtship. This is true, but it does not follow that the bright feathers are new. The feathers of the body, as already stated, overlap, and in some birds they look duller because they have brown, buff, grey, or some other soberly tinted fringes and tips. These hide the real colour of the feather, the brightly coloured portions underneath, but during winter the fringes get frayed and often wear off, and the bright portion remains, making distinct patches of colour. Birds that have quite different plumages in summer and winter have two almost complete moults.

Just to show how you can tell the distinguishing marks or characters of birds, let us take the three I mentioned earlier in the chapter—the sparrows. The house and the tree sparrows are near relations. The male house sparrow has a brown head with a grey centre; the tree sparrow has a copper-coloured head. It has, too, a distinct black spot on its cheek, which is whiter than that of the cleanest house sparrow. The male or cock house sparrow has a much bigger black bib than that of the tree sparrow. You will notice that I am speaking of the male house sparrow, but do not say male when I mention tree sparrow. The reason is that the male and female tree sparrows are alike, but there is a great difference between the cock and hen house sparrow. The young tree sparrow is like its parents, but the young house sparrow takes after its brown-grey mother. Now for the third sparrow, which really is no relation. The bills of the house and tree sparrows are strong and conical, well fitted for crushing hard seeds, but that of the hedge sparrow or dunnock is fine and pointed, more suitable for picking up small insects and crushing soft-bodied caterpillars. The colour of the hedge sparrow is bluish grey and brown, and it is a more slender, delicately shaped bird than the sturdy true sparrows.

There is a more striking difference in the voice. The house sparrow has several different notes or chirps, each of which no doubt means something, and its love call, *tschissik*, cannot be dignified as a song; but the warbling ditty of the dunnock is one of the simplest and yet sweetest of our familiar garden and lane-side songs. When we have learnt the songs and calls of various birds we shall be able to recognize them before we see them.



HOUSE SPARROW

The song of a bird may mean several things, but is always an expression of the singer's feelings or, as we say, emotions. The bird sings when excited, and the excitement may be because it is happy, or because it is angry. We hear the best songs in spring, for then the male bird is anxious to assert himself, to brag or boast. He wants some female bird to admire him and pay him attention, or he wishes to advertise the fact that he is the possessor of a certain spot and its surroundings, for there his mate will build her nest, and in the immediate neighbourhood, which naturalists now call his territory, he and she will seek food for the young when the eggs are hatched.

Some birds sing in autumn, and the robin sings nearly all the year round. Surely these sing because they cannot help it; they feel well and full of life and their happy songs bubble out. Some birds will sing when they are startled, but the song is short. Others sing when angry. I remember watching two male nightingales settling a dispute, and singing all the time.

The perching birds are often described as the singing birds, as if no other kind had any song. The rippling whistle of the redshank as it dances in the air in spring, and the long sweet whistle of the sandpiper when it flies with quivering wings close to the water, are true songs of love. So, certainly, is that beautiful spring call of the lapwing or peewit, and whatever we may think about the tone and quality, we must admit the same about the rasping, monotonous voice of the corncrake. Many of the less perfected songs are just call notes repeated very rapidly; they run together and make a trill.

Call notes are varied and have various meanings; they are the bird's signals or conversation; other birds know what they mean, though we are often puzzled. There are flight calls, uttered when the birds are travelling and wish to keep together; there are crooning and whispering notes when mates are together, and when we can only imagine that they are talking; there are sounds made by the parent birds to the young. Some of these are warnings, calls to give the alarm when danger threatens, or instructions to keep still. But others are notes of anxiety when the old bird fears that the young will get into trouble. Harsh calls of anger, like those of falcons and eagles, are very different in tone from the low notes uttered by the same birds when brooding their young.

The hunger calls of young birds, too, are quite distinct from the voices of the parents. Certainly we must not judge what a call means by its tone, for when jays are quite happy and friendly one towards another their harsh screams sound as if they were fighting or in great agony. The love songs of the divers have been likened to the cries of children in severe pain.

Though some people imagine that they know what each call means, I am quite sure that no one knows them all. But the birds of the same kind who hear them understand very well indeed. Many are just the birds' ways of talking to one another. By watching and listening we may learn which bird makes each call or sound, and guess by what the bird is doing what that sound means, but we are yet very ignorant about the language of birds. The songs of the blackcap, garden warbler, nightingale, thrush, and blackbird are a few examples of very beautiful music, and the creaky crow of the partridge, the caw of the rook, the solemn croak of the raven may not be beautiful in our ears, yet these and all other bird notes have interest, and are pleasant to hear when heard in the right place.

CHAPTER II

COURTSHIP AND MATING

In the last chapter I pointed out that male birds sing best in spring, for at that time they are excited by trying to obtain mates. But they do more than call attention to themselves by their voices; they show off or swagger in other ways. They posture and strut; they turn themselves round so as to show back as well as front; they droop their wings and spread and shake their tails; in fact they perform many curious tricks and antics when trying

NIGHTINGALE

to make the hen bird look at and admire them. These curious actions are called *display*.

The main object of the displaying bird is to exhibit as clearly as possible any bright or attractive markings that he may possess. The cock chaffinch turns sideways on its perch and lowers one wing at a time, so as to show to best advantage the big white patch that adorns it; the robin holds his head up, pointing his bill skywards, and so exposes all his ruddy waistcoat; even the sparrow, wings drooped and crest raised, makes himself as gay as possible before his lady.

With tail-coverts raised so erect that his crested head leans against them, the excited peacock runs sideways, trailing the stiff feathers of one wing with a rasp along the ground. He shivers those splendid plumes until they rustle, as he swings his glories round to face the unresponsive peahen. More magnificent and yet almost ludicrous is the display of the great bird of paradise. The drooping orange plumes, which thoughtless women use for hat-adornment, are raised by the excited bird above his back, where they stand, shaking and glowing, like an immense and splendid crest. And all the while, croaking in hoarse tones, he dances sideways along his perch. The great bustard when displaying seems to turn itself inside out. It ruffles up its plumage until a brown bird changes to a mass of snowy feathers.

Many birds dance when displaying. Cranes trip lightly, wings uplifted, and every now and then leap into the air. Ruffs, birds that wear very showy frills in the courtship season, gather at one chosen spot, called their 'hill', and there, with their bills to the ground and their frills sweeping the dust in front of them, crouch glaring at one another, waiting for a female, or reeve, to join them. Ruffs are supposed to be great fighters, but when the reeve does drop amongst these many rival suitors, they just pretend to fight, and literally dance and bound about as if all had lost their senses. The female does not seem to show what it is that she admires most, either in the gay frills or the absurd dancing, but when she flies off one bird alone follows. The others seem to realize that she has made the sign that means ' That's the man for me', and settle down, glaring again, until another reeve starts the silly performance off once more.

Ducks cannot dance in water, but they do their best. They dip their heads, and stretch them up; they bow and curtsey as they swim. Some of them, the goldeneyes for example, are very demonstrative; they throw up the bill so violently that a jet of spray flies up into the air, and then kicking up backwards they send up another fountain from their webbed feet.

In many species of birds, even before a mate is secured by all this elaborate display, the male selects the site of the future home. In other words, he stakes out a claim, fixing in his own mind the limits of the territory he desires, and there he sings, not only to try to charm any passing female, but to advertise to any passing males that this is his property and that he means to defend it with beak and claw. He does his best if another male bird accepts the challenge and as a rule drives off the usurper, but sometimes a rival male, selecting territory near-by, manages to steal part of the property. When this happens there will be frequent tussles on the boundary until nesting occupies the whole attention of both owners.

We find the male birds singing day after day in these selected areas, and, when a mate has joined him and a nest is built, we can guess how large each is. Then we shall be struck by the fact that there is all around an area which appears quite suitable for another nest, full of trees or bushes in which a nest might be built, and yet it is unoccupied. There seems to be room for many more birds than there are in every place we visit. Why is it that there are so many holes in trees that are never occupied by the large number of birds, like tits and starlings, that are always looking for nesting-sites? Why is it that there are so few nests in any one hedge, although there seems to be abundant cover for more, and every year many birds that do not build?

There are two reasons. The first is that though there often seems to be a very good supply of food for many more birds than we see eating it, the supply is really limited in nature. Just enough is there to feed a certain number of birds and no more. The territory chosen by the male may be more than he and his mate need; the food that can be found upon it would support more than two. But what will it supply when there is a nest full of hungry young mouths?

The other reason is more difficult to understand, but one thing is sure: that from the bird's point of view certain places are more desirable housing sites than others. These desirable residences, or rather places where the residence will be built, are occupied year after year, by no means always by the same pair, though there may be other places near, which, to our eyes, look quite as good. The fact is that as we do not understand the mind of the bird, we cannot say what it sees in any particular spot which it thinks better than those around. The bird knows what it wants and takes care that it gets what it wants.

The fact that there are every year so many birds looking for good nesting-sites, and apparently a scarcity of the best, and so many amorous males, and perhaps just as amorous though less demonstrative females, seeking mates, means that there is rivalry or *competition*. At school you compete with others and try to do better than they; in the playground you have games one with another or with rival teams and try to win; you do your best and so develop all that is best in you. The birds compete in the same way; they do their best to get what they want and need, and so develop those characteristics which will help them to win. The males by song and display try to win the most suitable mates; by defending their property they try to keep a big enough patch of ground to supply the needs of their families, and even when they have neither mates nor young to bother about they are forced to compete with one another for food.

The male bird in his display, if he is to be successful, has to do something better than other males who try to attract the female by similar antics. In some way he will show off his points to better advantage, or by more eccentric action catch the eye of the female and gain her approval. Even in the same species these displays vary a little, but it is always hard to say what it is about them which pleases the lady for whose benefit they are performed. I have spent a long time watching the queer courtship of the ruffs, and have never discovered what the reeve saw in the ruff she went off with that was better than in any of the other competitors. That she saw something we can be sure.

In competition for the nesting-site there is something else that the bird has to consider: its own safety and the safety of its young. Birds have many enemies, not only egg-collecting boys, but other birds that feed upon them or their eggs; mammals, like rats and weasels, snakes and, in some countries, lizards, and by no means least important, insects which are troublesome and often dangerous parasites. The bird has not only to compete with rivals for the safest place in which to build the nest, but has to compete with its enemies for its life. They strive to destroy its life or the lives of its young so that they may keep themselves alive. The bird needs to find a home where it and its young will be safe from enemy attacks. The competition of the hunter and the hunted is very keen, and through this constant struggle to live the best powers of the hunter and the hunted are developed by the slow changes brought about by what we know as *evolution*.

There is a 'Struggle for Existence'. The hunter must keep itself fit, quick, or cunning enough to catch or outwit some of the hunted or it will starve. The hunted birds must be sharp-eyed, alert, and swift, or they will be caught and slain. Many of them are, but the sharpest, quickest, and cleverest survive, and the species is not destroyed by its many foes.

The necessity for care in the selection of the site, so that dangers may be avoided, explains the way in which many birds hide their nests, and this we shall deal with in the next chapter on Making the Home.

CHAPTER III

MAKING THE HOME

BEFORE the bird starts to make a nest or decide where to lay its eggs it must hunt for a suitable spot. Some birds are very careful; others seem to be just as careless. The song thrush nests early and is in such a hurry to build that it does not take great care. Its big nest is built in many different places, but is often in a hedge by the roadside. Early nests in hedges are easy to see, for the leaves are not fully out and thick enough to screen them. The big nest of dry grass, with the bright blue eggs spotted with a few black specks, tempts the small boy, and these early nests are often robbed.

Titmice are as careful as thrushes and blackbirds are careless. Long before they decide where to build they go round peeping into any possible holes in trees or walls. They will go into the holes, stop in a few minutes whilst they look at the possible accommodation, and then go on to seek for another hole. The wren is even more hard to please, for it will sometimes start two or three nests and leave them half-built before it puts in any lining material. A nest consists of an outer structure of strong material and an inner cup with soft lining for the eggs and young. This lining may be of hair, wool, fine grass, feathers, or even wood chips; the mud lining of the nest of the thrush has bits of wood or straw mixed in with the wet clay that it collects.

Lapwings and many other birds of the plover family make very little in the way of a nest. They scrape a round hollow in the ground and sometimes, but by no means always, pull round it a narrow border of straws, grass stems, or bits of stick. They too, especially the lapwing and the ringed plover which nests near the seashore, make many scrapes before they decide which is best for the eggs. Some of these birds of the shore, the terns or sea-swallows for example, are quite irregular about their nests. The common tern will lay its two or three mottled eggs in a shallow cup-shaped scoop in the sand, or it may collect quite a number of blades of maram and stems of dwarf willow and make a large nest.

When the birds have decided where to build they at once collect material for the nest. This varies greatly according to the species. Rooks fly up to the rookery trees with sticks in their beaks, and for a start make a rough but strong platform. They do not pick up old sticks, which might be rotten, but pull living twigs and branches from the trees. If the stick is not the right size or shape and does not fit, they drop it and go for another. In this way they waste much time and many sticks, and they never seem to search amongst the dropped sticks for one that would fit in later when the nest is nearer completion. But they do appear to think that some other rook's sticks may be better than their own, and do not hesitate to rob a neighbour's half-built nest if the rightful owners are not on guard.

Jackdaws build in holes in trees, rocks, or buildings, and often fly up to the nest with a long stick, and try to go straight in. Naturally the ends sticking out on each side of their bills stop them with a jerk; yet in spite of many bad shots they collect enough to make a big stack of sticks, and, at the top, line a small cup and in this put their eggs.

The nest cup is moulded by the bird. She sits in it and turns round and round, pressing it down and rounding the sides; every now and then she twists in a loose end. There is great difference in the skill in nest building. Some birds are very neat and tidy; the chaffinch is a good example. It felts moss and lichens amongst the bents, and when its nest is fitted into the fork of a branch it is so small and round that it is very difficult to see. If the tree has moss or lichen on the trunk, and the chaffinch has decorated the nest with lichens, it is still better hidden. She may not know that she is hiding her nest from enemy eyes, but I am sure that she takes pleasure in making it look nice; she decorates the outside. There was one chaffinch that built her nest near a church where there had been a wedding a short time before. She took a fancy to confetti, and stuck the many-coloured bits of paper round her nest. A waterhen which built in a bush beside a lake in a city park had a fancy for tram-tickets; it collected these and worked them in amongst the blades of which the nest was made. At any rate she helped to clear away the litter thrown down by thoughtless people.

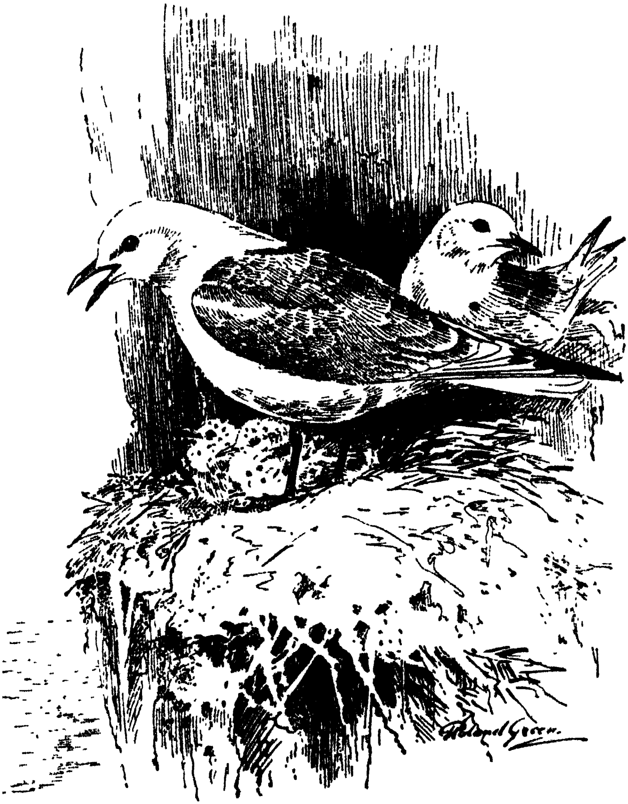
You will notice, perhaps, that I speak of the nest builder as she. The male bird may help by bringing material, but in most cases the female is the architect. Sometimes if he tries to help she will drive him away, so he often does nothing except keep guard, and perhaps she likes to hear him singing to her.

The mistle thrush is an example of a rather careless builder; one that built just opposite my house left long strips of paper fluttering in the wind. The starling crams a quantity of straw and other litter into its nest-hole, but often gives the place away by leaving a few straws showing at the entrance.

The kittiwake, making a nest of seaweed, leaves strands fluttering in the wind, but that nest hardens until almost as firm as the rock on which it is built.

Some birds that lay their eggs in hollows scooped amongst pebbles on the beach use no fringe or border of nesting material, yet they very carefully and neatly pave the nest hollow. Many oystercatchers and ringed plovers though by no means all, will do this. The paving may be of small stones or of whole shells, but often it is of broken bits of some special shell, oyster or cockle, for instance.

There are far too many interesting and beautiful nests for me to tell about them here. I will just mention the mud nests of the house martins that fit so neatly under the eaves, and the much more elaborate clay cave of the South American ovenbird. The tiny goldcrest slings its hammock nest beneath a bough, covering it and strengthening its supports with spiders' silk, but the Indian tailorbird does better still. It places its nest between big leaves, twists a thread of fibre or picks up a discarded bit of string, stitches the edges of the leaves together and completes its clever work by a knot so that the stitching will not slip. Some of the Asiatic swifts make their nests of their own saliva; they mould it, as it dries, into a half saucer, one side attached to the rock. These nests are collected, and when boiled make excellent soup.



KITTIWAKE

CHAPTER IV

THE EGG

The bird begins its life in an egg, and the egg is covered with a hard shell, which may be white or coloured. Most eggs are ovoid, which means egg-shaped, that is, one end is rather bigger than the other. Some, eggs of guillemots, plovers, and sandpipers, for instance, are even more pear-shaped. Eggs of owls, kingfishers, and woodpeckers are much rounder, and those of swifts and nightjars more oblong—there is little difference between the size of the two ends.

The colours of eggs vary greatly. Eggs of ducks are usually tinted green, those of pheasants are olive brown all over; the eggs of dunnocks and redstarts are unspotted blue. Others have spots on white or tinted grounds—the robin and wren have eggs like this; eggs of larks and pipits are so closely speckled that they look as if they were all one colour. Eggs of kestrels and several other falcons are richly smeared with reds and browns, whilst those of some of the crows are well covered with greenish markings, mostly smears or blotches.

These various colours, no doubt, have their use, are of value to the bird, but it is by no means always easy to see how. There is a rule, with many exceptions, that eggs which are in a hole or covered nest will be white, but those which are in open nests, visible to the eye, will be coloured, so that the colour will make them difficult to see. It is an attractive theory, but like many others has drawbacks. The sand martin lives at the top of a burrow; the space between the mud walls of the house martin's nest and the roof prevents the eggs from being visible; both have white eggs. But the eggs of the swallow, built in an open nest on a beam, are speckled. The egg of the kingfisher in a hole in the bank of the stream is white, so is that of the woodpecker; but the nightjar's eggs, laid in the open, without nest, are so beautifully marbled that they are often most difficult to see. But though the white eggs of stock and rock dove are as a rule in covered sites, those of the ringed dove and turtle dove, and many other pigeons, are placed in open nests in full view, and they are just as white. Owls have white eggs, and many owls nest in holes in trees or buildings, but often brown owls and others will make use of the open nest built originally by a crow or pigeon.

Some coloured eggs, laid in open nests, are very easy to see. The blue speckled eggs of the thrush are far too conspicuous, and would be seen more frequently than they are if the bird was careless. She is a close sitter, not easily frightened off the nest. The female pheasant and the wild duck protect their very visible eggs by the same method;

their plumages are not showy like those of their mates, and they do all the sitting. Some other birds, however, do just the opposite; they run off and leave the eggs. Most of the plovers, gulls, and terns have eggs coloured so like their usual surroundings that they are very difficult to see, very much more difficult than the bird; these leave their nests immediately danger threatens. Grebes' eggs are white, but the bird, large and conspicuous when on the floating nest, slips off the nest and dives for safety. But before it does this, it very quickly and cleverly pulls some of the nest material, wet weed, over the eggs, and as a rule entirely conceals them.

The puffin and the storm petrel, birds that nest in holes, have white eggs, which, however, show near the larger end a zone of faint markings. Two questions have been asked about these eggs. Were the eggs of their ancestors white or coloured; that is, are they by slow degrees losing colour, or gaining it? And is the habit of nesting in holes an ancient one, or recently developed? The first answer we can guess at is that the eggs were originally white, for birds are evolved (which means descended from and changed in form) from ancestors which, if they were not reptiles, were reptilian in many ways. The eggs of reptiles are white. But whether the ancestral puffin laid its egg in the open, and when it did so the egg was beginning to develop colour to conceal it, or whether the colour is due to nothing but variation, which is the start of all change, we cannot say.

What we do know is that there is a great variation even in the colours of the eggs of birds of the same species—often in a clutch of eggs in one nest; and we presume that where that variation is useful to the bird, helping to hide its eggs from enemies, the colour gradually changes and becomes more and more useful. Where birds, like the rock auks, have few enemies, living in vast colonies in well-protected sites, variation runs riot. No eggs vary more than those of the guillemot and razorbill.

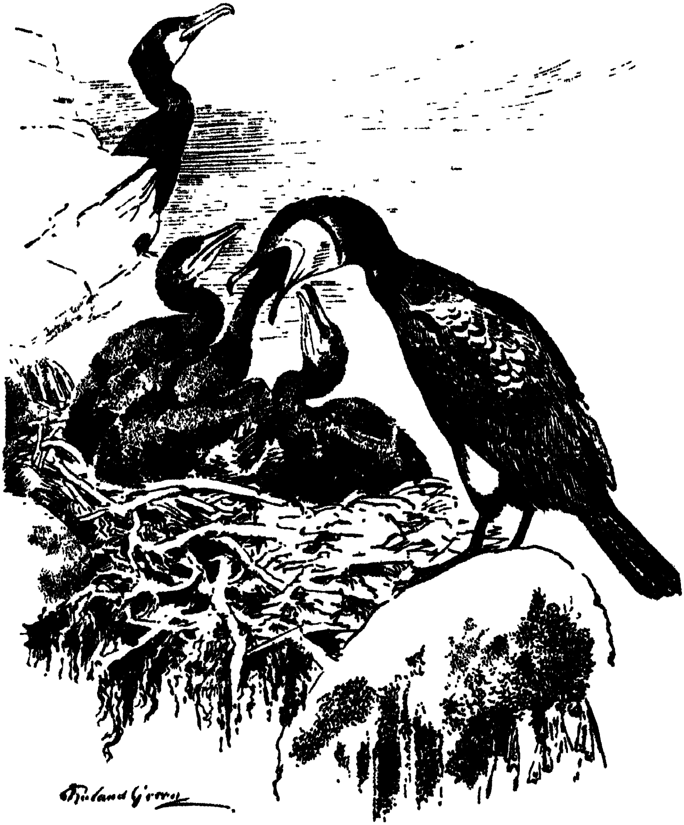
CHAPTER V

NURSERY DAYS

THE embryo bird grows inside the egg, feeding on the yolk-sac by absorption. But all birds are not the same age when they break the shell and become visible babies. Think for instance of the newly hatched sparrow, or any passerine bird; it is blind and helpless, naked or clad only in scraggy down, its head is huge, its feet also big, but its body looks small in proportion. Instinctively it puts up its thin neck and opens wide its mouth for its parents to cram in food; it is a very feeble infant, depending for food and warmth on its parents' care. Very different is the farmyard chick, or the down-clad infant of the plovers. Their eyes are open; they are well and warmly clad in close down, and in a very short time they can run about and actually look for food. The parent bird will guard them anxiously but has no need to feed them. It tells them by warning cries when danger threatens, and they obey by running to shelter or crouching silent and still, but as soon as the danger is past they look for food once more.

The old birds have to work hard to supply the helpless young with food, for the nestlings are always hungry. They grow quickly because they are fed often and well. When there are four or five little birds in a nest, all will open mouths when the parent arrives with food. How does that old bird know whose turn it is to be fed? Most birds do not begin to sit or incubate eggs until the full number is in the nest. Thus all hatch about the same time, and all should be equally strong and need the same amount of food. But owls and a few other kinds sit as soon as the first egg is laid; and, as eggs are laid at intervals, the first young one hatches some days before the last. The earlier birds are bigger and stronger than the others and get food sooner; yet in very few cases is the smallest baby starved.

I cannot tell you how the birds know which



CORMORANT

The young birds take fish from the mother's pouch nestling to feed, but after watching a pair of wrens attending to young in my garden I am quite sure that they do know. All these young flew safely. Your parents know you all, and why should we suppose that the bird cannot recognise its different children?

Birds are very anxious if danger threatens the brood, but only so long as the young need attention and cannot feed themselves. Later they either forget about their children or cease to care for them. Many old birds will drive away their young; they do not want them to be competitors for food.

Certain birds, though not many kinds, pay no attention to their young. Many of the cuckoos, and some South American birds that are rather like starlings, put their eggs in the nests of other birds. There they leave them, having put their nursing out, and the birds upon which they have foisted the eggs hatch them out and feed the nestlings, even after these have slain the rightful occupants of the nest. The cuckoo, at a very early age, ejects its bedfellows and so gets all the attention of the foster-parents. Indeed, after the young have been thrown out by the changeling murderer, the old birds will feed it while their real infants lie outside the nest, slowly dying.

Sheld-ducks, and a few other ducks, though they hatch their own eggs and tend the young for a short time, send them out to a nursery school.

I have seen a couple of sheld-ducks leading a big family of at least three different ages. Sometimes one bird will take charge of two or three dozen ducklings, and a friend of mine saw two birds followed by over sixty.

Although you will see it stated that the young birds are taught by the old ones—taught to fly, what to eat, and how to avoid danger—I fear that this is not quite correct. Often the old birds will, when the young have grown wing-feathers, tempt them to leave the nest, and sometimes give them a little push for a start. I have, however, seen young swallows leave the nest for the first time, and fly quite well, when there were no old birds near.

Those juvenile plovers, which are so well able to look after themselves when they break the shell, pick up anything in the way of food that catches their eyes. They may find it pleasant to eat or very nasty; they learn by experience. They are like children who pick leaves or fruit from the hedge and put them in their mouths; if these taste nasty they spit them out, and it teaches them a lesson. So the young bird samples what it sees and often must have unpleasant experiences; but it has a good memory, and does not repeat the experiment on objects which have once annoyed it. It learns, but is not taught, what to eat and what to avoid.

Then there are the ways of the world to learn, and in learning it suffers often. Yet we must remember that beside having good memories birds have another quality which we call inherited instinct. The little one may not know why, but it avoids danger without any outside help. Naturally nervous and careful, or perhaps unconsciously alert and ever on the look out, it behaves wisely. If it does not do the right thing its life is short.

CHAPTER VI

FOOD AND HOW IT IS OBTAINED

As a rule a glance at the beak of a bird tells us what kind of food it eats, but we must remember that many birds have a varied diet. Some eat one kind in one season and at another quite different food. Birds often are loosely separated as Useful Insect-eaters and Harmful Seed-eaters. This is quite unfair, as I hope to show, and there are, too, many birds that feed on fish, and others on flesh, killing birds themselves. What are we to say about these? You cannot classify birds by their food, for very closely related species have different tastes.

The seed-eaters are those that feed on vegetable matter, not only on seeds; their bills are usually stout and strong. The sparrow's bill is a good example, but that of the hawfinch, a bird that can crack a cherry stone neatly in two, is better; it is massive and powerful. Seed-eaters will eat caterpillars and other insects, will pull up seedlings and nip off soft buds.

Insect-eaters or insectivorous birds feed on all small invertebrates—worms, snails, and slugs, as well as insects. The fine, soft bills of robins and warblers are good examples. In autumn many of these insect-eaters take berries and fruit. The mistle thrush, starling, and blackbird attack the rowans, elders, and even pears, and the blackcap pays unwelcome attention to the raspberry canes.

Fish-eaters are a very mixed lot; their bills or beaks are by no means all of the same shape. The beaks of kingfishers, terns, herons, grebes, divers, and penguins, all fish-eaters, are rather long and pointed, stout and spear-shaped, but those of the fish-catching ducks, the goosander and merganser for instance, are much narrower than the broad bills of most ducks and have on their cutting-edges rows of tooth-like knobs, which must help greatly when they have caught a slippery, struggling fish. The cormorant has a strong hook at the tip of its longish beak, and below it carries a pouch or bag into which a captured fish slips; this pouch for carrying the catch is much bigger and more developed in that quaint fisher, the pelican.

The kingfisher, gannet, and tern will plunge from above upon the prey, either in the first case from a perch, or when flying or hovering over the water. Herons wade and stab at any fish that comes near their legs, but grebes, divers, auks, sawbills, cormorants, and penguins swim after their prey under water, and swim so fast that they can overtake the fish. Pelicans often work in companies, rounding-up shoals of fish in the shallows, filling their pouches before they swallow what they have caught.

The beaks of gulls are hooked, but the gulls eat all sorts of food, dead or alive, and the hook helps them to tear up anything that is tough. They eat much dead flesh, and the beaks of all flesh-eaters are more or less strongly hooked or curved, the upper part or mandible projecting over and beyond the tip of the lower. Eagles, falcons, hawks, vultures, all flesh-eaters, have hooked bills.

Even in the bills of the small insectivorous birds there is often a slight hook or overlap. This is well developed in the shrikes or 'butcher-birds', which will impale nestling birds, mice, or beetles on thorns or the spikes of barbed wire, whilst they tear them to bits. The hook in seed-eaters is very well developed in the crossbill, for the tips, as the name shows, do not meet but overlap, like the points of the sécateurs the gardener uses for pruning. Crossbills, though they do eat other things, feed very largely on the seeds of firs, larches, or other conifers; with their strong crossed bill they wrench the scales back to reach the seeds, and with the awkward-looking tool can, not only pick out the small seed, but, as I have seen, nip up a tiny aphis.

Parrots, which are mainly fruit-eaters, have strong hooked beaks. They can cut the stalks of fruit, and carve through tough husks. Amongst the parrots with the longest hooks are those in New Zealand which have within recent years taken to flesh-eating, tearing the fat round the kidneys from living sheep.

Many birds have a more varied diet, and these are called omnivorous, which means that they will eat anything. Crows, ravens, rooks, jays and the like are omnivorous; their beaks are strong and most are hooked to help them in tearing up food, but the long red bill of the chough is beautifully curved.

Amongst the plovers, sandpipers, and other wading birds there is great variety of bill shape. Some of the plovers have short, pick-like bills; they can stab at the worms, crustaceans, or insects on which they feed. The turnstone throws over stones or bits of weed with a neat toss of its short bill, and picks up the creatures that were sheltering below before they have time to hop away or burrow in the sand. The sandpipers have long bills, some curved downwards at the tip, as in the dunlin and curlew-sandpiper, others turned up a little, as in the greenshank and godwit, or very much curved upwards in the avocet. The avocet mows small crustaceans and surface-swimming insects from shallow water with a curious sideways sweep. The curlew's long bill curves downwards, and it will push this into soft mud or pick up a tiny animal from weed or rock with equal skill.

The best mud-probers are the snipes and woodcock. The tips of their long bills are very sensitive, and not only can they feel for worms or other animals when they cannot see them, but they can, by just opening the tips but not the whole bill, grip them and pull them out of the mud. The oyster-catcher has a long, stout, and highly coloured red or orange bill, and this is quite blunt at the tip. Though it has been affirmed that it cannot and does not open and eat oysters, this has been shown to be a habit on American oyster-beds. In England it either smashes open the shells of thin-shelled molluscs, or forces the valves apart when it has got its bill inside the gaping shell. But the blunt bill is used in another way, for the bird is fond of limpets. If you try to pull a limpet from the rock to which it clings, you will find that it is stronger than you, but if, before you touch it, you give it a smart tap with a stick, it is more than likely that it will fall off. The oyster-catcher knows what to do. Stepping up without alarming the mollusc, he gives it a smart tap with his blunt bill, and after that it is an easy matter to scoop out the animal from its now useless shell.

Seeing what a variety of food birds feed upon, it is useless to try to class them as useful or harmful to us. Some of the seed-eaters (the goldfinch is one) feed almost entirely upon the seeds of weeds that are most troublesome to the farmer. Even the birds that kill and eat other birds may be quite useful. Owls eat sparrows, and sparrows are far too numerous in the cornfields. Kestrels, though they

BARN OWL

eat mice and beetles and do not kill many birds, have a strange liking for the flesh of starlings, and there are far too many starlings. Of course, the flesh-eating or raptorial birds kill birds which we call useful as well as those that are troublesome. After all, they only kill to keep themselves alive, and that is more than many sportsmen can say. The peregrine with a splendid rush through the air strikes and kills instantly the pigeon that it has sighted below it. The merlin dashes on the moorland meadow pipit, and the sparrow-hawk singles out an unfortunate greenfinch from the scared flock, and there is one greenfinch less. The predatory birds are always striving to obtain a meal, but many more hunted birds escape than are captured. The small birds are always alert, watching for possible danger, and, dashing into cover at the shadow of the hawk, many survive. A few minutes after the dangerous foe has passed they return to their feeding and begin to sing, for they are not really in terror for long.

There are other flesh-eaters which, though we do not admire their ways, are most useful. The vultures and turkey-buzzards are first-rate scavengers, feeding on dead animals, and so cleaning up the countryside, which would be very unpleasant and unhealthy did these carcases remain in a state of decay. Ravens, too, and many of the crows, as well as the gulls, are useful devourers of decaying animal matter. A medical officer of health at an important fishing-station told me that he could not keep the port clean and sweet without the help of the herring gulls.

CHAPTER VII

GOING OUT INTO THE WORLD

ALTHOUGH there are some birds, especially in the Tropics, that never go very far from the place where they first saw the light, the majority have distinct summer and winter homes. When they travel between these two we say that they *migrate*. The winter home may be very near that of summer, a few counties or even but a few miles away, or it may be far across the sea in some distant country. Thus a robin may nest in a wood or a bank in a lane, and it and its young remain in that neighbourhood all summer, but when winter comes it finds that the gardens near the houses are more interesting and profitable. There it can look out for food provided by kind people or for anything that the gardener turns up when digging. It has migrated from wood or lane to garden. Most of our robins are called resident because they do not go abroad, but the robins from farther north are regular migrants. I have seen them, shy, quiet birds, in the bushes and hedges in large numbers the day after they reached the East Coast from across the North Sea. I have seen them skulking about in the thickets in their winter quarters on Mediterranean islands.

The birds that we call our summer visitors are those which nest with us but leave us in late summer or autumn and do not return until spring. It is easy to think of these, the swallow, martin, cuckoo, nightingale, and all but one of the warblers, as well as many others you can fill in for yourself. But there are others that we do not often think of as migrants, because we can see some of the same kind about all winter. Some thrushes, skylarks, starlings, wagtails, and pipits migrate, and we do not know which of the birds of these kinds that we see in summer will stop and which will go away.

When the summer visitors leave us the winter visitors arrive. They nested farther north, and unless we have unusually severe weather they will be quite content with the climate and the food which our Islands will supply in winter, but in the spring they will be off again to their true home, for surely the place where the bird nests and rears its family is its real home.

In addition to these are a large number of birds that pass through our land or along its shores which we call birds of double passage, or spring and autumn migrants. Their homes are often very far north, and their winter quarters very far south, but on their journey they stay with us for a few days or for many weeks before they continue their long trek. Some travel immense distances, from the far-north Arctic Regions, right across Europe, America, or Asia, to the Cape, Patagonia, or Australia. They may travel 15,000 or 16,000 miles in two long journeys from north to south and back again.

Ever since the Bible was written, and even earlier, men have known that some birds migrated, but it was not until the present century that we found out much proof of where birds went; before that people guessed and some of the guesses were true. When we began marking birds by putting a light ring on their legs we found where many went to for the winter, and also that birds often came back to the same place, even to the same nest. We knew that there were swallows like ours in winter in South Africa, but we did not know that some of them were our birds until they were found there wearing the bracelets that were given to them before they left England. The Hungarians found out that their storks went far south in Africa, and birds banded in North America were found far away in South America. Kittiwakes from the Farne Islands have found their way to America, and black-headed gulls from Germany have reached the West Indies. Lapwings, one of them ringed in Cumberland, crossed to Canada, and a common tern, marked in Maine in the United States was found three years later in Africa.

There are very many proved cases of shorter journeys, all very interesting, and we know now the general direction of the migratory routes of many birds. What we still do not know is how birds find their way, though we know that they can, as we often welcome back to their nests marked birds that have been far away south all winter. Some people think that they see landmarks which they know, but many young birds migrate before or after their parents, so that they cannot know the way. Sooty and noddy terns caught in the Gulf of Mexico and banded were taken far out to sea well to the north of their usual travels, and released at intervals, some 850 miles from their home, yet quite a number got safely back. Birds certainly seem to have a sense of direction, but we cannot prove it yet. Some day we may.

Man cannot fly like a bird, but he can now go up in an aeroplane to a very great height, and sometimes an airman meets with birds flying straight, knowing which way to go, at heights from 5000 to 10,000 feet above the earth or sea. I could tell you quite a number of cases of birds at great height, some published in books, some told me by men who saw them. Birds fly over the tops of the Alps, and even cross the Himalayas; ducks and waders have been seen on those great mountains at nearly 15,000 feet, and even smaller birds, like redstarts, pipits, and stints at 17,000 and 20,000 feet.

GOLDEN PLOVER

An airman has seen plovers flying on migration at 6000 feet above the earth

You must not get into your heads that birds always fly so high, for they are often seen crossing seas close to the waves. I have seen swallows flying in little flocks only a few feet above the sea, and have looked down on pipits passing just below the rail of a steamer. I am quite sure that the height at which birds migrate depends upon the weather conditions. When wind and other things are in their favour they travel high and fast, but when they meet the wind and it takes them longer to cover the distance, so that they get weary, they fly much nearer the ground or the sea.

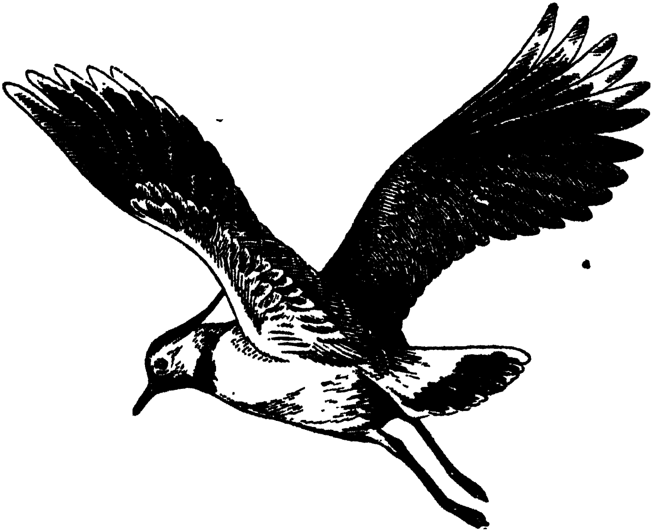
How fast they travel is another matter, but it is, of course, not always the same speed even for the same bird. A bird can go fast or slowly, just as you can run or walk, but when it is migrating it flies at its usual speed without hurry, unless it is frightened or has to exert itself to reach a shore. But the actual pace that it makes from one place to another depends entirely upon the speed of the wind. It took ornithologists a long time to realise this very simple fact, but the airmen knew it. The bird flies in a moving current of air. If it flies at the rate of 20 miles an hour when there is no wind, and if a wind springs up behind it and blows at 20 miles an hour, that bird will cover 40 miles of air, or 40 miles above land or sea, in an hour. But suppose the wind blows at the rate of 20 miles an hour in the opposite direction from which it is going; then the bird, if it flies steadily on, just remains flying above any particular spot. As a rule the bird flies a little faster than the rate that the wind is blowing, so that even when the wind is against it, it does get on a little. But whenever the wind is against the traveller the time taken to reach any shore or place towards which the bird is flying, takes very much longer than when the wind is behind it. And so migrants flying across seas often get so tired that they fall into the sea and are drowned, or reach the shore so weary that they can be picked up by hand.

As birds seem to have a very clear idea where they want to go, and we say that they have a sense of direction, it is not often that they fly with a wind dead behind them or right in their faces. A wind or current of air striking them sideways will drift them from the direct line in which they want to go. If you look at rooks flying to their roosts in the evening you will often see that they look as if they were flying sideways. They are being drifted aside by the wind. Then you will notice that they change their direction and fly for a short distance against the wind, only to turn and fly rather rapidly, but more or less sideways, in the other direction. They are doing just what sailors do in boats, tacking as they call it. That is what birds do when they are drifted out of their course when migrating, but often they get carried by the wind too far, and cannot reach the place that they were making for.

Birds alight head to wind. When they are flying in or on a current of air they are not blown over, but as soon as they touch the ground they may be blown off their feet if they do not check their speed by dropping against the wind. I have seen a storm petrel which was trying to rise from the shore in a strong wind, blown along the shore whenever it got on the wing, but it was not able to rise high enough and kept dropping, and immediately it did so, with the wind sideways, it was rolled over and over like a ball of feathers. I tried to drive it into the sea so that it could swim to safety, but the wind blew it along faster than I could run.

Although it seems hard to believe that a bird can fly for a long distance at an average speed of 100 miles per hour, we have one good instance where this seems to have been managed, and there are probably very many more about which we have no knowledge. When the lapwings crossed from our Islands to Newfoundland in December 1927, we know from the Air Ministry that the wind, at 1000 feet above the sea, was fairly steady from east to west at 55 miles per hour. A lapwing's ordinary speed has been estimated at 45 miles per hour, so that we get a rate of 100 miles per hour for these wind-blown birds. Now as the wind was not strong near the Newfoundland coast we have the calculation made by experts that the birds took from 22 to 24 hours to fly across the Atlantic.

Has it struck you that the northern birds that fly through the Tropics to the south, crossing the Equator, manage to get a summer all the year round? It is summer south of the Equator when we have winter here. So these birds chase the sun, and when the southern winter is coming on they return, still following the sun, and arrive back in time for our northern summer once more.



LAPWING—HERO OF A NON-STOP FLIGHT

Some birds that nest in the southern part of the globe do migrate north, but only a few cross the

Equator. In summer and autumn we find a few strong-winged shearwaters and petrels in our seas; they nested in the South Atlantic and wandered north. We do not get the small land birds from the extreme south, only these birds whose home is on the ocean at all times except when they are busy with their eggs and young. Northern birds are the longest travellers. And so far as we know no bird has a nesting season in the north and another in the south; our northern birds do not nest in their winter quarters.

CHAPTER VIII

ENEMIES OF BIRDS

When singing, when flying, hopping, running about, or when busily feeding birds look carefree and happy. And no doubt they are, though from the egg onwards they are threatened by many enemies. Eagles, hawks, owls, and other birds kill some; many mammals and snakes eat eggs and young birds; and man, the hunter, slays them for egg, flesh, or feather. So they are always alert, on the look-out, looking this way and that as if nervous, listening, too, for any unusual noise. Still we need not think that they are in a constant state of fear, that, as we say, they suffer from nerves. Just because they are always on the look-out, many escape.

When you cross a busy road, if you are wise, you look to right and left before you leave the pavement, but you are not afraid of being run over; you merely don't want to have an accident. So when the hawk dashes at and misses a bird which, in time, dived into the bushes, song is resumed or feeding begun immediately the enemy has passed.

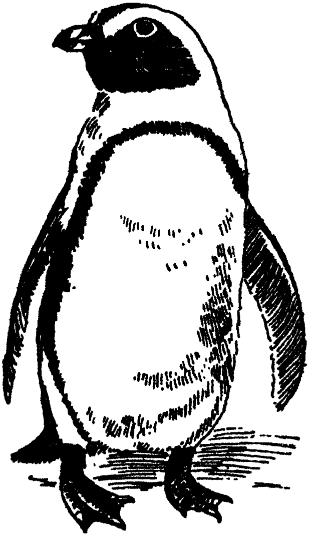
Most birds, having wings and moving more quickly in flight than in any other way, fly to safety when in danger. But all birds cannot escape this way. You must have heard the story that the ostrich is so foolish that when it sees the hunter coming it just buries its head in the sand and thinks that it is hidden. Well, that is not a true story, but like many other travellers' tales there is something in it. The ostrich, like many other birds, hides itself by crouching. Although it has a big body, when it squats, its long legs doubled under it and its long neck stretched out in front, it is not, at a distance, easy to tell from the scrubby bushes and termite heaps around it.

The nightjar and the Norfolk plover, though both can fly and the plover run fast, hide by crouching and keeping still, for their colours are so like their surroundings that they are difficult to see. The plover stretches its neck and flattens its chin on the ground, and many wild geese do the same with their heads and necks when they are sitting on the nest. Young plovers and sandpipers, gulls, and terns, and other birds before they can fly, keep quite still and quiet when they fear danger. Most of them have mottled down that fits in so well with the sand, shingle, or herbage on or in which they crouch that even sharp-eyed bird-eaters will pass close to them without seeing them. Some of the juvenile terns shuffle down until they are almost buried in the loose sand.

Many birds which have small wings cannot fly, and most of these are good runners. All relatives of the ostrich are runners; they have very strong legs and know how to use them. The queer flightless kiwi or apteryx of New Zealand is not only a quick runner but it only comes out to feed at night. Like other flightless birds it is in constant danger, and were it not now protected very carefully it very soon would be exterminated.

When the white man became an explorer and colonist he very quickly destroyed many kinds of birds which had lost the power of flight. You remember the Dodo in *Alice in Wonderland*. It was a real bird, distantly related to the pigeons, which lived in the island of Mauritius. There the Dutch found and described it more than 300 years ago. Probably the Portuguese knew it earlier for the name comes from one of their words which means a fool or simpleton. Linnaeus named it *ineptus*, which means the same. The foolish bird, unable to fly, was at the mercy of man and the domestic animals he brought with him. Though it was as big as a turkey its flesh was not thought good, but hungry dogs and pigs, turned out to fend for themselves, had a different opinion. By the end of the seventeenth century the dodo had vanished—and only a few pictures and bones remain to tell us what it was like.

Other relatives of the dodo disappeared so long ago that they are almost forgotten, and within more recent times a better-known bird, the great auk—the garefowl of the *Water Babies*—was killed off by sailors and others who found it easy prey.



PENGUIN

It does not follow that because a bird cannot fly it is in danger. Penguins have no long flight feathers on their flipper-like wings, but they live in huge colonies, even near inhabited islands, like the Falklands, and off the South African coast. It is not because many live in the Antarctic, as some people think, that they are so abundant. The penguin cannot fly, but it can swim under water fast enough to catch a fish, and fast enough to escape from some of its enemies—seals, killer whales, and big fish. If you doubt this watch the penguins being fed in the Zoological Gardens; you will see them rushing along the surface throwing up a wave like a speed boat or flying under water like a submarine.

Many birds which can and sometimes do fly well and far use their power to swim and dive to escape from danger as well as to hunt for food. The divers, the grebes, and the rock auks will all go under water rather than take wing if they see an enemy approaching. They will fly, however, if the foe is one which lives in the water.

If you go out in a coasting-steamer, a sailing-boat, or motor-boat when you are at the seaside, you often will see guillemots, razorbills, and the queer puffin, which lives in a burrow and not on the rocky ledges, swimming far away from the shore. When the boat gets near they may take wing, splashing along the surface before they get clear above the water, but as a rule they will dive and come up again far from where they went down.

Birds that are good swimmers and divers have their bodies built so that they can travel quickly under water. Their legs are far back, and their whole shape is like a torpedo or a submarine. Perhaps I am putting it the wrong way, and should say that we make our underwater boats in shape like a diving bird. Ducks are divided into two big groups, those which do not dive, called surface-feeders, and the others named diving-ducks. The surface-feeders, like the mallard, teal, and wigeon, jump straight up out of the water when frightened and are on the wing in a second; their wings and feet are further forward than in the diving-ducks. It is, however, very interesting to see that the downy ducklings of the surface-feeders will dive if in danger, and a wounded mallard will do the same. The diving-ducks, though with wings and feet set far back, usually take wing when scared, running along the water like the auks until they rise clear.

Once I watched a big dog trying to catch some baby sheld-ducks which were swimming on a pool. They could not fly because their stumpy wings had still no feathers, but though so young they dived well. Whenever the dog came near they dived and came up behind its tail, swimming under it. The dog was tired out long before they were, and never caught a single one.

I have mentioned that the big flightless though not wingless birds like the ostrich, emu, cassowary, and rhea are excellent runners, and there are many other birds which will run to safety rather than fly. Running may be used when seeking safety, not because the bird can escape better by speed, but because by running in and through herbage, it can more quickly get out of sight. The corncrake can fly across the sea when it migrates, but it seldom takes wing when at home. It puts its head down so as to be below the level of the grass and we lose sight of it at once. The water-rail, and indeed all the rails, which are very thin birds—even their breast bones are narrow—run quickly through the marsh plants, squeezing between the stems. It is difficult to make them fly.

There is yet another way in which some birds avoid capture. They do not really dive, or shall I say, quite dive, but they partly submerge themselves. I have seen both moorhens and dabchicks do this, and so well satisfied are they that they are hidden that they will allow themselves to be picked up out of the water. They sink the body until it is below the surface, but leave the bill above, so that they can breathe. I remember seeing what I at first thought was a small red flower amongst the rushes, but then found that it was the red bill and frontal plate of a moorhen, and it did not struggle until I had picked it up. The moorhen, I think, was clinging with its big green feet to the weeds or rushes, but a dabchick that I found was not. It was just under the bank, its whole body under water, its beak alone exposed, and was floating, keeping itself in position by paddling gently.

Most of the enemies of birds find their quarry when they see it moving—they chase it, fly it down, or pounce upon it, but if the hunted bird keeps still, hiding if possible, and keeps quiet too, it has a better chance of escaping than if it tried to fly or run away. To learn how to keep still is one of the earliest lessons of the young bird. The little blind, half-naked nestling will put up its head and open its beak for food if it hears a twig moved or feels any slight vibration, but it quickly learns sense when it gets its first feathers and opens its eyes; then you may find a nest full of little birds, all crouching down, wide awake but very still and silent.

Birds in the nest are in danger from other things than living creatures. They suffer from rain and cold, and also, though many people do not realise it, from heat. The old bird broods them, sheltering them from rain and keeping them warm, and when the sun is too hot she will stand over the nest, holding her wings open so as to give them shade. Then when she leaves the nest if danger threatens, she calls to them in language that they understand, and they obey and lie still.

CHAPTER IX

ANCESTORS OF BIRDS

SOME day your elders will ask you the old riddle—which came first, the egg or the bird? You may reply, the egg, for the first bird which really could be called a bird, certainly came out of an egg. What laid that egg, what the parent was like, is a matter that has never been settled. When the world was very young there were no birds, but some lizard-like creatures, whose bones when they died and got covered up with mud turned into stone (now known as fossils), had learnt to fly. We find these fossil bones in the rocks, which in many cases are nothing but mud hardened by immense pressure or altered by great heat.

We may be sure that these winged dragons could not fly well; they had to wait through many long ages, generation after generation getting a little better fitted for travel through the air, before they became anything like the birds we know to-day.

How it came about that lizard-like creatures turned into birds, or how some men believe that it came about (for the wisest man is but a child when he strives to fathom the mysteries of science), is too long and difficult a story for us to consider. One thing, however, is proved, so far as anything can be proved: that the ancestors of birds and of some of the cold-blooded reptiles of to-day were the same. Indeed, we may say that all creatures had common ancestors, and at one time all of these lived in the water. But as time passed and more and more dry land appeared, some of these fish-lizards came out of the water and learnt to live on land and breathe air. They were cold-blooded, and many covered with hard skin which we call scales. The birds, those early bird-reptiles, kept themselves warm by turning their scales into feathers, cosy clothes which kept the heat in their bodies; but those which did not but still kept their scaly covering, remained reptiles. Their scales did not store up heat; they depended upon the sun for warmth. To-day we see the warm-blooded, feather-clad bird able to get up early in the morning or to live happily in very cold places, but the snakes and lizards are sluggish and sleepy until the sun comes out and stirs them up. Many, too, in order to keep themselves alive in winter, hide away and sleep until the summer returns. This is called hibernation or winter sleep, but no bird is known to hibernate; they can keep themselves alive without much trouble so long as they can find food.

Some of these flying dragons, for that is what they look like to us, were not at all like birds. One kind, which seems to have been able to fly better than others, is called by a long name, Pterodactyl, which means finger-wing, for one of their fingers was very much longer than the others. From this long finger was a membrane or skin, which stretched along the animal's side, something like the leathery skin that is stretched between the fingers of a bat's big hand, right down to its feet. No doubt our finger-winged animal could glide through the air, making long gliding jumps, and very likely too it could flap its great hand-wings and get along through the air. But it was not the ancestor of all if of any birds.

Very much earlier than the days when many of these flying dragons flapped about there was a feathered animal, which we believe was an early bird, perhaps an ancestor of some of the many different kinds of birds that now inhabit our earth. Its name was Archaeopteryx, which means a very ancient animal with wings. So far two fossils only of this oldest bird have been found, but these show clearly that it had feathered wings, and a long feathered tail. The tail was not a bit like that of any bird that we know, for it was made up of a row or series of about twenty small bones, like the tail of a lizard, and from each bone sprang two feathers, one on each side. The tail of a bird is used in several ways, but mostly as a balancer or a rudder; when spread it helps the bird to glide or hover, and when the feathers are shut together like a closed fan the bird can fly more swiftly. Also the tail is invaluable when the bird wants to steer or turn in this direction or that. A long jointed tail, with feathers sticking out from the joints, might be wagged or swung from side to side, but it would not help the bird much in a wind. So we find that as the early birds improved their powers of flight they either got rid of some of the joints or shortened

PTERODACTYLS

and crushed others together. So we find a short and strong bone, made of several joints joined together or fused, as it is called, which supports the tail of the bird to-day. This bone and the flesh covering it is the 'pope's nose' in the chicken.

Archaeopteryx had teeth in both jaws. So had the flying dragons, and so had other early but much later birds whose remains have been found in America. One of these had such feeble wings that it is doubtful if it could fly. The shape of its body, however, suggests that it was a very good swimmer and diver, and like the penguins, which cannot fly, or the grebes, divers, and loons, which, though they can fly are quite at home in the water, it almost certainly lived and fed in the water.

Like the flying dragons this earliest bird that we know of had free fingers armed with claws, but careful examination of the two fossils shows that they were not all so free as is shown in some of the pictures which men have drawn of what they thought Archaeopteryx looked like when alive. No doubt, however, it used these claws when it was climbing in trees; its wings, then, were its hands. The baby water-hen and coot have a claw on the thumb, and when they want to climb up a bank or into the nest they use their stumpy unfeathered wings as hands and this claw as a finger.

The wing, so useful for flying, is just a big arm and hand, and many birds share with the fourfooted mammals and reptiles, this hand-like use of the fore limb. When I visited a big heronry in Hungary many of the young birds, which had not yet learnt to fly, tumbled out of the nests when frightened, and fell amongst the roots of the trees in the deep mud of the marsh. But they climbed back, clumsily it is true, grasping the branches with their feet and hooking their bills over twigs, but helping themselves, too, with their outspread wings.

A queer South American bird, the hoatzin, has, when young, quite a long claw on the free finger which it uses as it scrambles about in the branches above its native swamps. If the tiny hoatzin in the egg, known as the embryo, is examined it is seen that then it has three clawed fingers, like those we find in the fossil archaeopteryx. Indeed there is much about the structure and habits of the swamp-loving hoatzin which reminds us of its long-gone reptilian ancestors.

Though other birds use their wings as swimming hands, the penguins and auks, for example, it does not tell us how birds learnt to fly. But there are some queer little lizards in Australia which, when they are in a hurry, rise on their legs, lifting their front limbs off the ground, and run rapidly. The fossil bones of many of the long-vanished reptiles are often sure signs that these animals walked or ran more or less upright; their front limbs were short and feeble, the hind limbs long and strong.

We can guess that they jumped well, like kangaroos or jumping mice, mammals with longer and stronger hind than fore limbs. If, as has been suggested, they spread their arms when they jumped, any lengthening and enlargement of the scales on their arms would help them to glide, like the wings of an aeroplane. Then the next step to their advantage would be when these enlarged scales split, and turned from scales into feathers, soft and pliable, but just what was needed when they flapped their wings and made use of the support which the bird to-day gets from the air.

There have been many different ideas of how the wings, the feathers, and flight were developed in birds, and we must not say that any of them were quite wrong. These things may have come about in various ways. But we can at least guess that in those ancient days some of these bird-lizards found that they could escape from their enemies or catch their food better by running on their hind legs than by crawling, and that then they took long jumps and got on still better. Then they found themselves safer in the trees than on the ground, and when they had dropped into or climbed up into the trees they did not fear to jump from tree to tree, and from gliding learnt to flap and so, by very slow degrees, to fly. And all the time, though it took a very, very long time, their bodies in shape, and their body covering, were getting better and better fitted for their needs. Though there are some people to-day who do not agree with the great ideas by which Darwin and others tried to explain how these changes came about, I think we may say that those which were best fitted to exist were the parents of generations still better fitted, and those that failed to make the changes died out and left nothing to show what they were like but a few bones turned into stone.

In the birds we know to-day there is one relic of those scale-covered reptilian ancestors, for the strong grasping feet are still covered with scales, and the beak too, unfeathered, is nothing more than an altered reptilian snout.

CHAPTER X

THE MIND OF THE BIRD

Does the bird think? Many wise and great men have pondered over this question, and not only have they disagreed but they have quarrelled. The problem is still unsolved; some are sure that they do, others that they do not. The birds cannot tell us; we can do no more than watch them and see what they do.

One thing is quite certain—the bird's mind is not like ours; it works in quite different ways. What people do not agree about is whether the bird's behaviour is instinctive or intelligent. We really do not know what Instinct is, except that it is habit or way of doing things that the birds of to-day have inherited, or copied, without knowing that they are copying, from their parents and very very many generations of ancestors. They just do something because it is in their blood to do it, and without asking themselves or anyone else questions of why or how. Intelligence means that they know why and how they act as they do, and suggests that they think how they shall act when some unexpected difficulty arises.

I believe that if we watch birds very carefully we can see that they act in both ways according to circumstances. But it is always difficult to say what is just Instinct and nothing else, and where reason and intelligence begin.

When you were a baby you crawled—you crept about like a four-legged animal, though you never managed quite as well as even a very young kitten or puppy. Then your inherited instinct made you want to walk upright and you began to try by holding on to chairs or other furniture. You did this because something inside you told you that it was what you had to do, not because you saw your parents and other people walking upright. You tried to walk, unconsciously of why you tried. You may have been helped, but you were not taught; you had the instinct to walk.

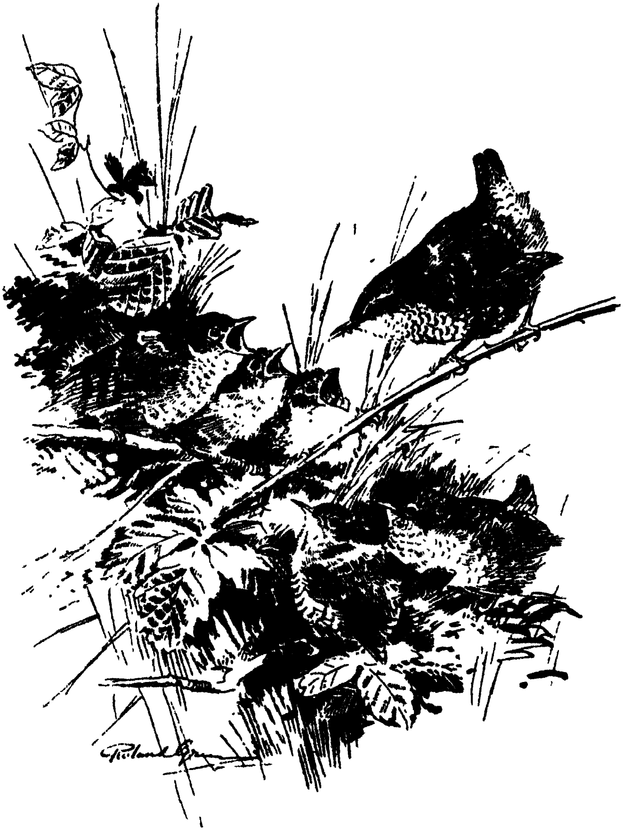
When you walk now you do something more, something which is instinctive and intelligent, and yet does not require thought. You do not think which foot to put forward next, though you use some thought to decide if you shall walk fast, run, jump, or skip. You use the right muscles by instinct, and they obey your wish, which is telegraphed from your brain through nerves to your muscles, and those muscles act in what is called a reflex manner. They reply to a question or command which is not given consciously, and your brain or mind does not trouble to ask if they have obeyed.

Many of the actions of birds are instinctive and reflex like many of ours. But every now and then the bird comes across some difficulty, or wants to do something that it does not usually do, and it then uses the senses it has—it has eyes, and can see, ears and can hear, nostrils and can smell, and it has too the sense of touch. It uses its sense organs to guide it, to tell it what to do.

Let us think about a few simple cases. The little bird in the nest, as we have seen, when it is still blind and almost naked, sticks up its scraggy neck and opens wide its mouth when it hears or feels the twigs and leaves stirring as if a parent bird had arrived with food. It does this instinctively, and the upward stretch is a reflex reply to the message it receives when it hears or feels movement. It gobbles down any food, either from its mother or from us, and if you put your little finger in its mouth it will try to swallow it. But when it is a little older, unless it has got very used to us feeding it, it will not try to take food from us, though it is always ready when its mother comes. It is beginning to be intelligent.

When it has left the nest and begun to look about, it will pick up anything which it sees and try to eat it. If the morsel tastes all right it is swallowed, but if not it is at once rejected. It experimented at first, after that it uses choice or intelligence, for it does not often seem to taste a second time food that it has found to be nasty. Whether the young bird, and the old bird too, has or has not intelligence, it certainly has, as I said before, a very good memory. In memory there must be some thought.

Although it is unwise to judge all behaviour of birds by our own in the same kind of circumstances, how else can we think about it? I have told you how a pair of wrens built a nest in my garden wall and reared a family. When one of the old birds came with food and the little ones popped out their heads, I could not tell one from another. But the parent bird could. It seemed to hesitate as it clung to the edge of the nest, just as if it was wondering whose turn it was to be fed. Certainly it seemed to be thinking. I do not know if all got



WREN

equal shares, but they all got enough, for when they left the nest they seemed all to be fit and strong. Some people would say that the old bird knew by instinct which needed food. Perhaps, but I think that he or she looked to make sure that the more greedy ones did not get everything.

A friend of mine wanted to take photographs of a nest of young water-rails. She put up a tent, a hide, near the nest. One of the old birds was uneasy; the new mound with its round staring eye, the lens of the camera, was something that she did not understand. I think that it was the mother bird. Did she desert the nest? Not at all. We can only believe that she thought, in her own way, and made up her mind that it would be best to have a nest a little farther away. She must have thought, too, where it would be safe. One by one she picked up the young and carried them out of sight amongst the reed stems; then with great difficulty she picked up two still unhatched eggs and took them away. She had no inherited instinct to avoid cameras or hiding-tents, but the unexpected danger, which she feared, seemed to make her think. She acted in what we must admit was a reasonable manner. Surely it was thought that made her leave the eggs (which are of less importance than the young) until the last.

The infant ringed plover, whilst still in down, responds instinctively to the warning note of its mother, and crouches at once when she tells it that it is in danger. But there was one brood that I watched on a shingle beach which made me wonder how much they thought. When the tide was full the little ones fed amongst the stones. When I poked up my head from above a wall which sheltered me from their sight, the mother piped her warning and at once the little grey-downed babes squatted amongst the many-coloured pebbles which hid them well. But when the tide was out the birds fed along the edge of the tide, and, if the mother called, they did not crouch on the bare sand where they would have been quite easy to see, but ran to the nearest stone or lump of seaweed before they vanished. They did what was wisest under different circumstances; they must have known what they were doing, and behaved as if they knew why.

Some rather older lapwings behaved in the same way. They were feeding in a walled park, and they either crouched at once or ran for shelter when I stood up in the bracken in which I had been hiding. If they were in a hollow or close beside a clump of thistles or other plant, they dropped at once. But if they were out on the open sheep-clipped grass they ran, sometimes many yards, either to a gutter and dropped over the edge, to one of the weed patches, or to the wall. There their down and juvenile feathers helped them to hide. Did they know what they were doing? I am sure that they did, and their very good memories told them just which was the nearest hiding-place that they could reach.

I could tell you many more stories of birds that seem to show that they think, and I believe that they have a certain power of reasoning. They consider what will be the best thing to do when there are two or three things that they might do. But, at the same time, we must not be too ready to say that a bird is thinking when it looks as if it was in deep thought. You must have seen the thrush standing on the lawn with its head a little on one side. It looks as if it was listening and thinking. But probably it is just keeping one eye on a spot amongst the grass where it has seen a little bit of worm coming out of a hole. It waits until enough of the worm is out of the hole and then it pounces before the worm can get back underground. Looking for food may be quite instinctive, and the pounce when it got the worm may be a reflex action, but it is also possible that the thrush may ask itself—'Is there enough out yet?' or 'How long will it be before this very slow worm comes out of its hole'.

I told you that the bird is not really nervous, does not live in a state of constant fear of enemies, but has an instinctive habit of keeping its eyes and ears open. And I believe that the bird has an inherited instinct to build a kind of nest like that that its ancestors built, but I am quite sure that it does look about for a safe place in which to build, and that if that place does not quite fit the kind of nest it is used to building, it will make some changes. The bird has a mind and uses it, but as I said before, that mind and its ways of using it are not like ours. We cannot imagine that the bird sits down like we do to think over a problem, what it shall do and how, for its mind works very quickly. And it makes mistakes just as we do, and perhaps not quite so many. Its mind is more undeveloped than ours, although it has a much longer history behind it than we have, for those half-reptile, half-bird ancestors from which it developed were on the earth long before man appeared. The bird has more sense than those ancestors, for it has a larger better brain, in proportion to its size, than any of them ever had, or than any reptile possesses to-day.

CHAPTER XI

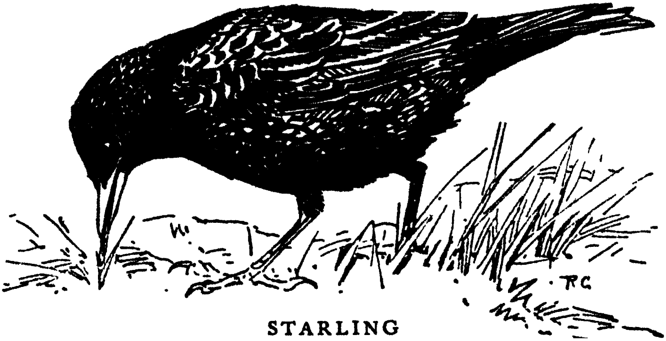
THE VALUE OF BIRDS

MANY grown-up people, who ought to know better, think about birds only as useful or harmful to men; they estimate the value of birds in terms of pounds, shillings, and pence. They are thinking about themselves, not about the birds. One bird they say is good to eat, another has beautiful feathers, useful for decorating hats, yet another has a pleasing song. The farmer, thinking of his crops, says that one kind is an enemy because it eats grain or seedlings, and another a friend because it picks up insects in his fields. The sportsman rears pheasants or protects partridges and grouse, not because they are good to eat, but in order that he may have the pleasure of shooting them. He is very careful of them when they are young, and any other bird which also likes killing game is called 'vermin', and is condemned to death. Even the owl, which the farmer would preserve, because it is a useful rat and mouse catcher, he dislikes because it picks up young pheasants that have stayed up after they ought to have gone to bed.

The fisherman, who enjoys angling, dislikes the kingfisher and heron; they are rivals, catching what fish they need for food. The professional fisherman, who provides us with wholesome and much-needed food, has more excuse when he objects to the cormorant and tern, which he thinks take away from his chances of making a decent living; and the farmer may well be annoyed when great flocks of sparrows raid his cornfields. When the bird is called valuable or harmful because it protects or attacks our food-supplies, or the way in which we earn our living, we are quite right in trying to find out its true value; but I think that we should be careful when we use the word friend, and should never use the word enemy. The bird that attacks grain or other food stuff may be a competitor, and we may have to fight against its numbers, but it is not trying to rob us knowingly. It just takes what it finds that is good to eat, and when it finds a field full of tempting grain, or a garden or orchard rich in fruit, it has no idea that this feast was not intended for it. How is it to know that we have not grown these for birds, for do we not throw down crumbs and hang up cocoanuts especially for its benefit? The fact is, the bird wants to eat and live just as we do; we have to do our best to keep it from eating our food or we could not live.

As I tried to show you when telling about the food that birds eat, we must not be in too big a hurry to say that a bird is harmful because it is troublesome at one time of the year, or in one particular place. Nor must we condemn a bird that injures one man and yet does good to others. The owl is a very good example of what I mean; the sportsman does not like it, but the farmer does. Sport may not be wrong, but the sportsman should remember that whilst he is thinking about some birds as giving him pleasure, and others as taking away some of that pleasure, there may be people who have quite different ideas. The pheasant may come out of the wood and pull up young plants, and the kestrel and owl, which he dislikes, may be badly wanted by the farmer whose land is damaged by mice and voles.

The starling which eats so many pears when they are ripe is a very useful bird in a meadow where caterpillars or 'leather-jackets' are eating the grass roots; and the blue tit, which is now accused of pecking holes in apples and eating buds on the fruit trees, is one of the best hunters for insects in the woods in winter, and most of the insects that it finds do a great deal of damage to trees. Even the heron, which the fisherman knows eats some of his trout, is very fond of eels, and eels kill far more trout than herons, for they eat the eggs and the very young fish in great numbers. Very much the same may be said about the tern, which the fisherman says eats young fish that might grow into fish big enough for us to eat. This is quite true, but the fish that the tern eats more than any other is the



STARLING

sand-eel, and the sand-eel is a very hungry little fish and kills and eats very large numbers of the young food-fishes. It is probable that the tern does us far more good by killing off sand-eels than harm by eating food-fishes.

Again, the game-preserver does not like the sparrow-hawk because it carries off his young pheasants, and the poultry-keeper gets very angry with it when it picks off one chicken after another. But, as its name shows, this bird feeds very largely on sparrows and other birds, like greenfinches, which eat a large quantity of valuable corn, and if all the hawks were killed off, as some people wish they were, there would be all the more sparrows to rob the farmer and us of the food we live on.

We must, as we say, take a wider view, and try to find out what is the value of birds as a whole. Plants, insects, birds, and animals are dependent on each other, and if we manage to kill off, or, as we call it, exterminate, some bird, say, which we think is troublesome, we are either allowing some other creature which it kept in check to increase, or are starving other kinds which fed upon it.

What would happen if there were no birds? Insects and weeds would increase enormously, and trees would be leafless, plants devoured, and the trees themselves be bored by beetles, and larvae of moths and sawflies, until there would be no sound wood to build with or use for furniture. We might protect some of our fruit by spraying with poisons, but we could not afford to spray the whole country. We should have to fight against the insects, slugs, and snails very much more than we do when birds are helping us, as they do now.

What does happen when insects get too numerous ? I can tell you what did happen when the caterpillar of a small moth, known as the antler moth, increased so quickly that very great damage was done. These caterpillars fed on the grass on the hills, and in many places ate so much that there was not enough left for the sheep; then when they had eaten all on one hillside they travelled in great armies over walls and roads to other slopes, and though millions were drowned in brooks that they tried to cross, and the roads were slippery with those that were crushed beneath wheels and boots, there were enough left to frighten all the hill farmers.

But birds gathered from far and wide. I saw them, great flocks of rooks, daws, starlings, gulls, even finches, swarming over the places where the caterpillars were thickest, and in a very short time they had gobbled down enough to check the alarming increase. When voles, bigger foes of grass and sheep farmers than insects, threatened and devastated the Scottish sheep-runs, kestrels, hawks, and short-eared owls suddenly arrived in far greater numbers than had ever been seen before, and whilst clever men were wondering how they were going to check the plague, the birds took the matter in hand and stopped it.

That I think is how we must think of the value of birds. They are our helpers because they keep the balance true; they do not allow any other creature—bird or other animal—to remain long in such great numbers that our well-being is in danger. And this balance is not kept here only, but all the world over.

SHORT-EARED OWL

You may have heard of locust swarms, or locust migrations. Every now and then the locusts in some part of Africa get so very numerous that they eat up everything that they find, and then in a huge army they travel right across the country, some flying, some walking, and eating up every green leaf that they meet until the land that they have crossed is as bare as a desert. They do an immense amount of damage, and leave people as well as other animals starving, but they would do far more were it not for birds. With and over this army of insects travel and fly another army of birds, and all the way the birds feed greedily on the locusts. No one knows how when these plagues appear the birds learn where there is food in plenty, but they get some sort of message, for they turn up in much greater numbers than are ever seen in the district at ordinary times. Nature arranges that: how we cannot say.

I have told you how birds migrate from place to place twice a year. This means that countless millions of workers, for birds are workers, sweep across the globe, our northern birds travelling south in autumn and back again home in spring. And as this great tide of birds travels, each bird tries to keep itself alive by eating something, so that as the birds pass in wave after wave, plants and animals are destroyed in immense quantity. Some of the travellers eat things that we want to eat, and others eat the creatures which eat our food; some do us harm, some do us good, but all of them are helping to keep Nature's balances true.

Can you imagine what would happen if a great army of men from northern Europe and Asia marched south, feeding on what crops and fruit they could find, but as they went killing off all the fierce animals, the lions and tigers and the poisonous snakes that they met with in Africa and Asia, and many of the biting mosquitoes and other insects that trouble us. We should suffer from the loss of food, but should benefit by the destruction of dangerous and troublesome animals. Then in a few months the army would pass through Africa and Asia and Europe back to its home in the north, and though it would want more food which it would be hard to supply, it would again help to get rid of those creatures that bothered us, and would weed the fields as it went along. This is really what happens, though the army is of birds, not men, and the food they eat does not leave us starving, and the animals they kill off are not so big and many, not so dangerous as those that I mentioned. But the migrating birds do weed our fields, though they eat some of the food we need; and they may not kill lions and tigers, but some of them kill snakes, and very many of them kill the insects which spread disease and death throughout the world.

We owe far more than we often think to birds; it is almost impossible to realise their great value to Man.

That brings me to my last chapter: How should we protect birds? For they, without knowing that they are doing it, help to protect us.

CHAPTER XII

BIRD PROTECTION

Birds, as a whole, we agree are of value. How then should we protect and encourage them? Many of you feed birds, especially tits, in the garden; and this is quite good. When a robin boldly comes into the house, or a swallow or house martin nests somewhere near, you are pleased. But feeding birds, especially when they are not really hungry, is not protection, though it is useful. What we want is to see that birds are not killed thoughtlessly, or eggs taken and rare birds or valuable birds destroyed. As it is very hard to say which are and which are not valuable, it is best to protect all birds, except in certain places where some kind has become so abundant that it is a real nuisance.

Most of all we need to preserve any kind of bird that is so rare that it may become extinct, that is, cease to exist, unless we help it. Make it illegal to kill these rare birds, you say. Yes, but in many cases anyone who kills or takes the eggs of these so-called protected species does break the law already, and if found out can be punished. We have laws, good laws, but it is not easy to get some people to obey them, and very difficult to find out who breaks them. We must have some improvement on Law.

SPARROW-HAWK

If you put some money where anyone can see it, and do not watch it or get someone else to watch it, it may be stolen. It is wrong to steal, but are you not doing wrong too in giving the thief a chance? That is what the Law does, but we must not only blame the Law; those who make the laws should see that it is possible to have them obeyed.

All birds are the nation's property—they do not belong to you and me as individuals but to all of us as a nation, and we must look after them to keep them here for the benefit of those who will be citizens in the future. Now, to guard all birds and their nests, especially very common ones, would mean far more money and time than the nation can spare. Think of what a lot of policemen would be needed to watch every nest of thrush or blackbird in case some small boy should want to steal an egg! So that if we wish to give rare birds a chance we must provide places where they may not be shot or their eggs be stolen. These places we call Sanctuaries, and there are many of them already. They are guarded by watchers, who are keepers, not merely gamekeepers, but guardians of all birds.

Some belong to the Royal Society for the Protection of Birds, others to the Selborne Society, the Norfolk Naturalists, and many other bodies of men and women interested in birds. Some very useful ones are on private property and are supported entirely by their owners. Others, the parks in many cities and towns, are protected by the Corporation or Council. Many have been put under the protection of the National Trust, so that they will always be the nation's property, but unfortunately so few people give money to the Trust that it cannot afford to pay keepers, and all the guarding of National Trust Reserves, as they are called, has to be paid for by local committees.

Even in a garden you may possess a private sanctuary if you put up nesting-boxes for those birds that will use them, grow nice shrubs and thickets for others, and leave any old tree with holes in it for the benefit of owls, woodpeckers, nuthatches, and other birds that like to make their nests in holes.

Trying to get birds to nest in your garden may not please your neighbours. A bullfinch would be an ornament in the garden, but in your own or someone else's orchard it might do damage by stripping fruit-buds in spring. A rookery near the house is amusing and interesting, and I have told how useful the bird may be, but as it eats both animal and vegetable matter, farmers in the district will have cause to complain if the rookery grows too large.

Professional fishermen say that cormorants have increased too much since birds were protected.

Cormorants and shags are interesting to watch, especially when they are feeding their young. As you will see in the picture on page 37, the mother bird fills her pouch with the fish that she has caught, and at the nest allows each little one in turn to push its head into this lucky bag to see what it can find. But cormorants take fish out of the nets, and the fisherman says that if the cormorant had not got there first he might have caught those fish that are given to the young and sold them for human food. He has to make his living and so has some excuse for disliking the cormorant. Really the chief value of bird protection is to preserve species that are rare.

In some places rare birds have been saved when they had very nearly been driven away, and in others, birds which had long ago given up nesting with us have been tempted back. There are the kites in Wales and the bittern and harriers in Norfolk, for example. It is very sad when our efforts come too late and a species vanishes, like the passenger pigeon and Esquimox curlew in America. The Kentish plover has been saved in England, and the kiwi in New Zealand by protection, and by making the places where they nest into sanctuaries.

In the Malays both the English and the Dutch are trying to check the destruction of the birds-of-paradise. For centuries there has been a trade in the wonderful plumes of these birds, and though exportation has been stopped in many places, at great cost, many skins are still smuggled out of the country. But if there was no European and American market for the plumes the trade would cease, and women could stop a cruel and destructive slaughter if they refused to wear the plumes. This is work for all girls who care about birds; when they grow up they can refuse to buy or wear illegally imported feathers.

You may say—'what can we children do, we have no land, little money, and no vote in Parliament?' Well, you will have a vote some day, and I hope other things too, but you can do something now. You can learn to value and love the birds and get your friends to be interested as well. You can join Boy Scout or Girl Guide companies, and see how they try to save birds, plants, and all living things from being destroyed. You can take your share in Bird and Tree days, and you can, if you can afford, give a little money to some society that needs money to pay watchers of sanctuaries. A very little money from a large number of people is more valuable than big sums from a few, for everyone who takes interest in birds is helping to preserve them. When you grow up you will be able to look at the birds and feel that you helped to save them.

I am an old man and remember what it was like more than fifty years ago, for it is just fifty years—half-a-century—since the first really good law was passed for the protection of birds. Before that anybody shot any rare bird he saw, and anyone stole whatever eggs he wanted. It was stealing even then, for the eggs were stolen from the birds and from the nation which had the right to own them. Now I can see birds in large numbers that were very rare then, like the great crested grebe, the turtle dove, and, in some places, even the starling.

The Law has done a very great deal, but something else has done far more. And that something is the growth and spread of interest and love of living birds and not of dead specimens. Interest amongst playmates, in homes, in schools, not only amongst the grown-ups. That interest began when I was a child and grew up amongst children. You who will be the grown-ups some day can carry on this work now. May I say Now with a capital N, for you are never too young to love Birds.

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